

Environmental Health

Naval Submarine Base, Bangor - Silverdale, WA PUBLIC HEALTH ASSESSMENT FINDINGS

Background

Naval Submarine Base, Bangor (Bangor) is located in Silverdale on the Kitsap Peninsula along the eastern shore of Hood Canal in Kitsap County, Washington. Environmental investigations of contamination at Bangor began in 1978. By 1987, 22 hazardous waste sites had been identified on-Base, that required further action under the federal Superfund Law. In August 1990, Bangor was listed on the Environmental Protection Agency's (EPA) National Priorities List of contaminated sites identified for long-term cleanup. Bangor then entered into an agreement with EPA and the Washington State Department of Ecology to conduct further investigations and cleanup.

Ordnance Disposal Areas

In the past, workers were exposed to contaminants in surface soil at various sites identified around the Base. The primary contaminants of concern in soil at Bangor are ordnance compounds (2,4,6-trinitrotoluene (TNT); Royal Demolition Explosive; 2,4-dinitrotoluene; and 2,6-dinitrotoluene) found at high levels due to past demilitarization activities disposal of ordnance by burning and detonation. Workers were exposed to contaminants in soil through accidental ingestion, dermal contact, and inhalation of dust.

A low risk for adverse cancer and non-cancer health effects exists for workers exposed to contaminants in soil before the cleanup occurred.

This risk is primarily due to high levels of TNT in

surface soil at two sites. It is important to note that this risk is based on a "worst-case" scenario and is highly dependant upon the length of exposure and work practices. Those workers using personal protective equipment or who were not frequently involved in demilitarization activities at those two sites would have had significantly less exposure.

No apparent public health hazard exists for workers currently exposed to soil at any hazardous waste site on-Base.

Cleanup has either been completed or is ongoing at sites which contained contaminants in soil above levels of potential health concern.

Mountain View Road

Contaminated groundwater moved from the Public Works area on-Base southeast into the Mountain View Road area. In 1984, 1,3-dinitrobenzene was detected in a residential well. However, later sampling and analysis could not confirm this detection and no other wells tested positive for this contaminant. The unconfirmed detection of 1,3-dinitrobenzene in September 1984 represented a very low risk for adverse non-cancer health effects.

In August 1986, a gasoline recovery system was installed in the Public Works area to remove gasoline that had leaked from an underground storage tank into groundwater. In February 1994, volatile organic compounds (VOCs) and the herbicide bromacil were found in a newly installed but unused well. The Base immediately

provided bottled water to area residents and began groundwater investigations that found a VOC plume in groundwater near the Mountain View Road area. The primary contaminants of concern were 1,2-dichloroethane and benzene. By December 1995, all residents in the affected area were connected to the Silverdale public water supply. Some residents were exposed to 1,2-dichloroethane in their wells before receiving an alternate water supply. This exposure was estimated to result in a very small increased cancer risk (e.g., one additional cancer per 100,000 persons exposed over many years).

Mountain View Road area residences are no longer connected to the contaminated groundwater from the Public Works area of Bangor, therefore no apparent public health hazard exists.

Vinland

A groundwater plume consisting mainly of Royal Demolition Explosive exists in both **perched** and shallow groundwater near the northern border of the Base, adjacent to the community of Vinland. Groundwater in the shallow aquifer is estimated to move primarily to the west discharging to Cattail Lake. Residential and public supply wells in Vinland do not appear to be at risk from groundwater contaminants from the Base. However, a private well nearby should be sampled for ordnance compounds to ensure that it is free of contaminants.

Ongoing groundwater cleanup and monitoring will ensure that drinking water wells in the Vinland area are protected.

Hood Canal Shellfish Harvesting

Over the past 10 years, sediment, fish and shellfish sampling has detected very little contamination along Hood Canal and Cattail Lake. Only low levels of polycyclic aromatic hydrocarbons were found in sediment along with trace levels of phthalates and ordnance (explosive) compounds in shellfish from Hood Canal, and trout from Cattail Lake.

The beaches below the former landfill at Floral Point are not currently open to shellfish harvesting. Although sediment and shellfish sampling indicated that the landfill is not a source of contamination, further sampling of shellfish should be conducted before reopening Floral Point Beach.

No public health hazard exists for residents exposed to contaminants in fish or shellfish taken from Cattail Lake or Hood Canal beaches.

Olympic View/Old Bangor and On-Base Supply Wells

Ordnance compounds originating from the Base have moved in shallow groundwater about 3,500 feet to the northwest. Public and private supply wells in the communities of Olympic View and Old Bangor are located in both the shallow and sea-level aquifers approximately one mile northwest (downgradient) of the plume. Bangor supply wells are located in the sea-level aquifer about two miles north of this plume. Groundwater contaminants seem to be restricted to the shallow aquifer.

Although the distance and depth of the Bangor supply wells should protect these sources of Base drinking water from contamination, there is an inactive supply well that should be sampled for ordnance compounds. Sampling this well will determine whether contaminants have reached the sea-level aquifer and show whether they pose a threat to downgradient drinking water wells in the Old Bangor and Olympic View communities.

The current groundwater extraction and treatment system at Site F should prevent further migration of contaminants in the shallow aquifer. Continued sampling of monitoring wells at the leading edge of the Site F plume will ensure that any further migration towards off-Base drinking water supplies is detected.